When the mica sheet was split in two, approximately equal discharges were obtained from the original condenser and the condensers formed with each of the parts, thus exhibiting the analogy with a magnet when broken into parts.—On the magnetisation of iron cylinders, by O. Grotrian. The parts of an iron cylinder not too short in comparison with its diameter, magnetised by a homogeneous field in the direction of the axis, are very differently magnetised when saturation has not been reached, the outside parts being much more strongly magnetised than the axial ones.

SOCIETIES AND ACADEMIES.

LONDON.

Chemical Society, June 21.—Dr. H. E. Armstrong, President, in the chair.—The following papers were read: A specimen of early Scottish iron, by Miss M. D. Dougal.—The interaction of sulphide with sulphate and oxide of lead, by J. B. Hannay. The two equations—$PbS + PbSO_4 = 2Pb + 2SO_2$ and $PbS + 2PbO = 3Pb + SO_2$—given by Percy, to represent the reactions occurring in lead smelting, are insufficient. A much more complex reaction occurs, since metallic lead when formed attacks the remaining sulphate, producing litharge, which in turn reacts with the sulphide; further, some of the sulphide is removed by solution in the metallic lead, whilst some is volatilised as the compound PbS,SO_2.—The mineral waters of Cheltenham, by T. E. Thorpe.—The oxidation of tartaric acid in presence of iron, by H. J. H. Fenton. Tartaric acid is oxidised by certain agents in presence of a trace of ferrous salt with formation of a new crystalline dibasic acid, $C_4H_4O_6, 2H_2O$; it is a powerful reducing agent, and forms crystalline salts.—The supposed relation between the solubility of a gas and the viscosity of its solvent, by T. E. Thorpe and J. W. Rodger. From the results of their own experiments on the viscosity of solutions of gases, the authors are led to modify the conclusions of Winkler respecting the relation between solubility and viscosity.—The specific character of the fermentative functions of yeast cells, by A. J. Brown. Pasteur's view of the cause of the exhibition of the fermentation functions of yeast cells is that it is a starvation phenomenon brought about by lack of free oxygen during the life of the cells in a fermentable liquid. The fermentative power was measured by Pasteur as the ratio of yeast to sugar; the author finds, however, that there is no direct constancy of proportion between the weight of yeast formed and of sugar fermented. Pasteur's experiments are consequently insufficient, and his theory unproven.—Observations on the influence of temperature on the optical activity of organic liquids, by P. Frankland and J. MacGregor. The authors have measured the rotatory powers of methylic and ethylic salts of active glyceric and diacetylglyceric acids at various temperatures; the percentage increase in rotation as the temperature rises is greater for the methylic than for the ethylic salts.—The maximum molecular deviation in the series of the ethereal salts of active diacetylglyceric acid, by P. Frankland and J. MacGregor.—The preparation of sulphonic derivatives of camphor, by F. S. Kipping and W. J. Pope. The sulphonic chlorides and bromides of camphor and its halogen derivatives are best prepared by treating the ammonium salts of the corresponding sulphonic acids with phosphoric chloride.—Dextro-rotatory camphorsulphonic chloride, by F. S. Kipping and W. J. Pope.—On the combination of chlorine with carbon monoxide under the influence of light; preliminary notice, by G. Dyson and A. Harden. There is a well-marked period of photochemical induction in the amount of chemical action occurring when light acts on a moist mixture of equal volumes of carbon monoxide and chlorine.—Solution and pseudo-solution, part ii., by S. E. Linder and H. Picton.—Solution and pseudo-solution, part iii., by H. Picton and S. E. Linder. The continuation of previous work on solutions is described in these two papers.

PARIS.

Academy of Sciences, July 23.—M. Lœwy in the chair.—On the photographs of the moon obtained with the great *coudé* equatorial of the Paris Observatory, by MM. Lœwy and Puiseux. The difficulties met with in taking these lunar photographs are detailed, and an account is given of the methods used in overcoming them. Further, the photographs obtained are discussed and compared with maps and previous photographs.—On a new series of sulphophosphides, the thiohypophosphates, by M. C. Friedel. The iron, aluminium, zinc, copper, lead, silver, mercury, and tin salts are described. The series is viewed as consisting of salts of the general type $P_2S_6M'_4$.—On two menhirs found in Meudon wood, by M. Berthelot. Two previously undescribed sandstone menhirs have their characteristics given in detail.—On the reduction of any differential system whatever to a completely integrable form, by M. Riquier. The conclusions of this memoir are summarised as follows:—"Being given a differential system involving any number of unknown functions and any number of independent variables, simple eliminations, together with differentiations, allow, in general, of putting them into a completely integrable form, of which the order is nearly always superior to one, and approximates to a linear and completely integrable form of the first order."—On the specific inductive capacity of glass, by M. F. Beaulard. The influence of the time of charging has been studied by the ballistic method and k calculated for an instantaneous charge, the author finds $k = 3·9$.—On the electrolysis of copper sulphate, by M. A. Chassy. With a neutral saturated solution of copper sulphate at 100° and a current density of a hundredth of an ampère per square centimetre, a bright red deposit of cuprite in forms derived from the cube and octahedron is obtained. By lowering the temperature, diminishing the concentration, or augmenting the current density, varying proportions of metallic copper can be obtained along with the red crystals. In determinations of current by electrolysis of copper sulphate it is necessary, in order to avoid serious error, to acidulate and pass the current through cold dilute solutions.—On manganese steel, by M. H. Le Chatelier. The anomalous results found previously by the author in studying the electric resistance of (13 per cent.) ferromanganese are explained by the formation of two allotropic varieties of the metal. The temperature of transformation is 740°, that temperature at which soft iron passes from the magnetic to the non-magnetic state.—On metaphthalodicyanacetic ether, by M. Locher.—Organo-metallic combinations of borneol, camphor, and monochlor-camphor with aluminium chloride, by M. G. Perier. The compounds having the formulæ

$$(C_{10}H_{18}O)_2Al_2Cl_6,\ (C_{10}H_{16}O)_2Al_2Cl_6, \text{ and } (C_{10}H_{15}ClO)_2Al_2Cl_6$$

have been obtained in crystalline condition. They are very unstable in air, and are readily acted on by water with production of the original constituents.—On a new acid, isocampholic acid, by M. Guerbet.—Action of phosphorus pentachloride on tetrachloroquinone, by M. Et. Barral.—On essence of Pelargonium from Réunion, by MM. Ph. Barbier and L. Bouveault.—On the condensation of formaldehyde with alcohols of the fatty series in presence of hydrochloric acid, by M. C. Favre.—On the existence of hydroxyl in green plants, by M. A. Bach.—On the presence of several distinct kinds of chlorophyll in the same vegetable species, by M. A. Étard.—Researches on the causes of the toxicity of the serum of blood, by MM. Mairet and Bosc. The authors demonstrate the following conclusions:—(1) Blood serum has both toxic and coagulating properties. (2) The coagulating properties are destroyed by heat or by the addition of sodium chloride or sulphate. (3) The symptomatic effects produced by intravenous injections of pure serum are mostly due to the toxic properties of the serum, the coagulating effects making themselves felt only near the limit of the toxic action. (4) The alcoholic extract has no toxic or coagulating properties, these being only shown by the precipitate. (5) By partial precipitation with alcohol, the toxic and coagulating substances may be separated. (6) Both belong to the albumenoids.—On the structure of the membrane of Corti, by MM. P. Coÿne and Cannieu.—On the metamorphoses of *Cecidomyia destructor*, Say, and on the puparium or larval envelope before its transformation into a chrysalis, by M. A. Laboulbène.—On the origin of "sphères directrices," by M. Leon Guignard.—The radical tubercles of *Arachis hypogea*, L., by M. Henri Lecomte.—Influence of the distribution of humidity in the soil on the development of chlorosis of the vine on a calcareous soil, by MM. F. Houdaille and M. Mazade.—On a magnetic perturbation, by M. Moureaux.

BERLIN.

Physiological Society, June 8.—Prof. du Bois Reymond, President, in the chair.—Dr. J. Munk gave an account of an

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experiment made on a dog as to the nutritive value of gelatine. Up to the present it was only known that gelatine alone could not make good the need for proteids, but that a diet of gelatine with some proteid leads to a reduction of proteid metabolised. Dr. Munk had propounded the question, how far can gelatine take the place of proteids? and had carried on an experiment of four days' duration. After the dog had been placed in nitrogenous equilibrium on a diet of meat-meal, rice and fat containing 9½ grms. of nitrogen in the form of proteid, five-sixths of this nitrogen was replaced by nitrogen in the form of gelatine: the animal continued in nitrogenous equilibrium. It appears from this that by the administration of gelatine the nitrogen necessary as proteids can be reduced far below the minimum metabolised in starvation, without any commencing metabolism of tissue nitrogen. Dr. Munk made a further communication on metabolism. It is known that the administration of carbohydrates to dogs leads to a saving of proteids. Recently it has been supposed that this saving is determined by the possibility that the carbohydrates lessen the putrefactive changes which proteids undergo in the intestine, so that they are absorbed unchanged in larger quantities. Since it is known that proteids are absorbed very rapidly from the intestine of dogs, and that the absorption is complete in about six hours, Dr. Munk gave a dog at one time 100 grms. sugar along with his meal of proteid, and at another time the proteid meal in the morning and the 100 grms. sugar later on after an interval of thirteen hours, when presumably there would be little or no proteid in the intestine. In both these experiments he noticed the same saving of proteids. In the first there was additionally a falling off of the ethereal sulphates in the urine, evidencing diminished putrefaction of proteids in the intestine. In the second case, where the sugar was given separately from [the proteids, the ethereal sulphates were very slightly lessened in amount, so that here apparently there was no diminution of the putrefactive changes, and still the carbohydrates had saved the proteids. These experiments do not support the view recently put forward.—Prof. König gave an account of his experiments on Dr. Zumft for determining the position of the layers of the retina which are sensitive to light.

June 22.—Prof. du Bois Reymond, President, in the chair.—Dr. Marcuse gave an account of experiments on frogs in studying pancreatic diabetes. After having satisfied himself that extirpation of the pancreas in frogs leads in most cases, at latest after two days, to a distinct diabetes, he investigated the effect on this of total extirpation of the liver. Although the frogs lived from two to five days after the operation, no diabetes was observed in any one case. Notwithstanding the numerous hypotheses as to the influence of the liver and pancreas on the sugar of the blood, it is not as yet possible to offer a satisfactory explanation of the above observations. Prof. Zuntz had recently endeavoured by a lengthy series of experiments to determine whether any one alone of the food-stuffs, proteids, fats, or carbohydrates can be regarded as the source of muscular energy. The experiments were made on a dog, which can be fed and nourished quite well on either proteids or fats or carbohydrates (rice and sugar), and showed that each one of the above three food-stuffs suffices to provide the energy necessary for the work done by the muscles. Comparative experiments made to determine which of the three food-stuffs can be most advantageously employed for supplying this energy, have not as yet led to any decisive result. This important research is to be continued.

GÖTTINGEN.

Royal Society of Sciences.—In the *Nachrichten*, No. 2, 1894, the following papers are published:—A. von Koenen: On the age of the mineral veins of the Harz Mountains.—J. Disse: On epithelial buds in the olfactory region of mammalia.—W. Voigt: On media without internal forces, and on a mechanical interpretation of the Maxwell-Hertz equations thereby furnished.—J. Bohls: Notes on the capture and natural history of *Lepidosiren* in Paraguay.—E. Ehlers: On *Lepidosiren paradoxa* (Fitz) and *articulata* (nov. spec.) from Paraguay.—P. Günther: Gauss's researches in the theory of the elliptic functions.—Robert Fricke: An application of the ideal theory to the substitution groups of the automorphous functions.—E. Riecke: The theorem of the thermodynamic potential of a heterogeneous system in equilibrium, with an application to van der Waal's theory and to the law of the boiling-point.—W. Felgentraeger: Whiston's isoclinal chart and the secular change of magnetic inclination in the east of England.—W. Nernst and R. Abegg: On the freezing-point of dilute solutions.—C. Fromme: On the self-induction and electrostatic capacity of resistance coils, and their influence on magnetic phenomena.—F. v. Dalwigk: On a substitute for Dirichlet's principle.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

BOOKS.—London Matriculation Directory, No. xvi., June, 1894 (London).—Practical Work in General Physics: W. G. Woollcombe (Oxford, Clarendon Press).—Smithsonian Institution Report of the U.S. National Museum, 1892 (Washington).—Die Wissenschaftlichen Grundlagen der Analytischen Chemie: W. Ostwald (Leipzig, Engelmann).—Verzeichniss der Elemente der bisher berechneten Cometenbahnen: Dr. J. G. Galle (Leipzig, Engelmann).—Studien über Docoglosse und Rhipidoglosse Prosobranchier: Dr. B. Haller (Leipzig, Engelmann).—Psychologie des Grands Calculateurs et Joueurs d'Échecs: A. Binet (Paris, Hachette).—A Dictionary of the Economic Products of India: Prof. J. Watt, 6 Vols. (Calcutta).—Gesammelte Werke von H. Hertz: Band 3, Die Prinzipien der Mechanik (Leipzig, Barth).

PAMPHLETS.—Demonstration du Principe de l'Equivalence: M. G. Mouret (Niort, Lemercier).—Bericht über die Thätigkeit des Königlich Preussischen Meteorologischen Instituts in Jahre 1893: W. von Bezold (Berlin).—A Short Guide to the Larmer Grounds, Rushmore, &c.: Lieut.-General Pitt-Rivers—The Consumption of Steam and Water in Steam-Engines: W. I. Ellis (J. Heywood).

SERIALS.—Quarterly Journal of Microscopical Science, July (Churchill). Mathematical Gazette, No. 2 (Macmillan).—Physical Society of London, Proceedings, Vol. xii. Part 4 (Taylor and Francis)—Longman's Magazine, August (Longmans).—Good Words, August (Isbister).—Sunday Magazine, August (Isbister).—Zeitschrift für Physikalische Chemie, xiv. Band, 3 Heft (Leipzig, Engelmann).—Journal of the Sanitary Institute, July (Stanford).—Transactions and Proceedings of the New Zealand Institute, 1893, Vol. xxvi. (Wellington).—Humanitarian, August (Hutchinson).—Century Illustrated Magazine, August (Unwin).—New Science Review, Vol. 1, No. 1 (26 Henrietta Street).—English Illustrated Magazine, August (198 Strand).—Chambers's Journal, August (Chambers).—Proceedings of the Edinburgh Mathematical Society, Vol. xii. (Williams and Norgate).—Quarterly Journal of the Geological Society, Vol. L. Part 3. No. 199 (Longmans).—Geological Journal, August (Stanford).—National Review, August (Arnold).—Contemporary Review, August (Isbister).

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